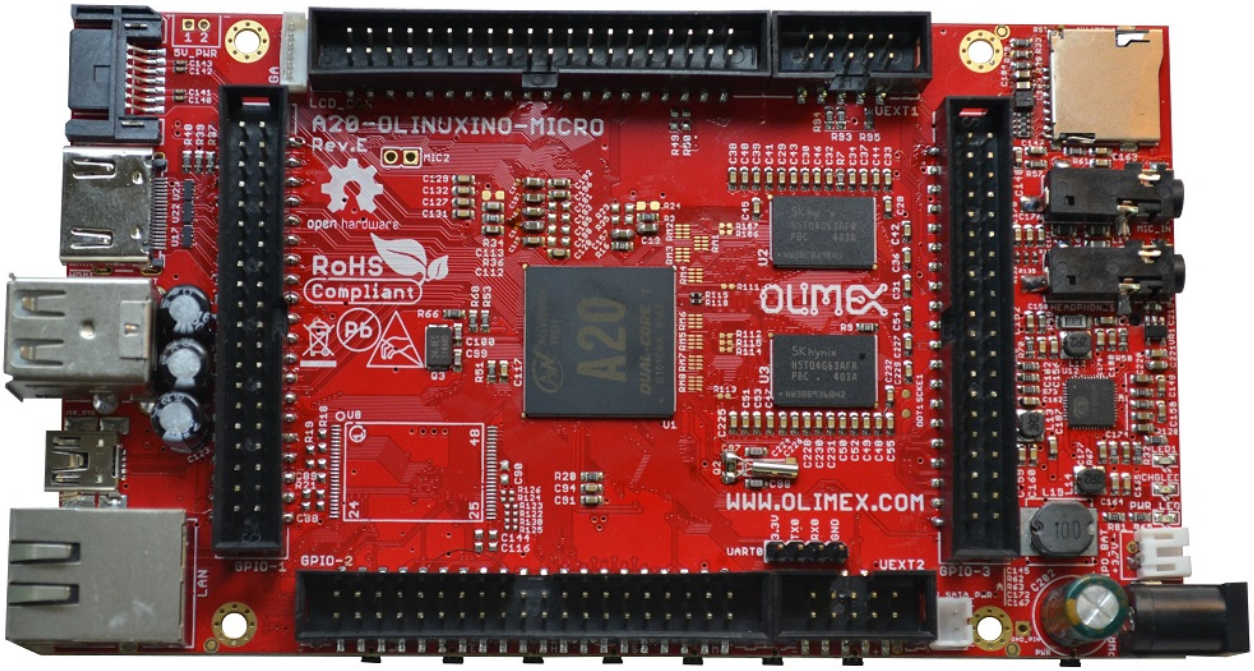

A20-OLinuXino-MICRO

Open-source single-board Android/Linux mini-computer

USER'S MANUAL

Revision I, May 2014
Designed by OLIMEX Ltd, 2014

lead-free

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CHAPTER 1: OVERVIEW

1. Introduction to the chapter

Thank you for choosing this OLinuXino single board computer from Olimex! This document provides a user's guide for the Olimex A20-OLinuXino board. As an overview, this chapter gives the scope of this document and lists the board's features. The document's organization is then detailed.

The A20-OLinuXino-MICRO development board enables code development of applications running on the A20 microcontroller, manufactured by Allwinner Technology from China.

OLinuXino is an open-source, open-hardware project and all documentation is available to the customer.

1.1 Features

The board has the following set of features (please note the difference between the two versions of the board):

- A20 Cortex-A7 dual-core ARM Cortex-A7 CPU and dual-core Mali 400 GPU
- 1GB DDR3 RAM memory
- **4GB NAND FLASH memory (available only on the 4GB version of the board)**
- **Android already loaded on the NAND (available only on the 4GB version of the board)**
- SATA connector with 5V SATA power jack
- Built-in FullHD support (1080p)
- 2 x USB High-speed host with power control and current limiter
- USB-OTG with power control and current limiter
- HDMI output with ESD protectors
- VGA output on 6-pin 1.25mm (0.05") step connector
- 100MBit native Ethernet
- Battery connector with battery-charging capabilities
- Audio headphones output on connector
- Microphone input on connector
- 2 x UEXT connectors
- LCD connector compatible with with 4.3", 7.0", 10.1" LCD modules from Olimex
- 160 GPIOs on three GPIO connectors
- MicroSD card connector
- SD/MMC card connector
- DEBUG-UART connector for console debug with USB-SERIAL-CABLE-F
- GPIO LED
- Battery charge status LED
- 2KB EEPROM for MAC address storage and more
- 10 BUTTONS with ANDROID functionality + RESET button
- 4 mount holes
- 6-16V input power supply, noise immune design
- PCB dimensions: (5600×3250) mils ~ (142.24×82.55) mm

1.2 Target market and purpose of the board

The boards from the OLinuXino family are easy to setup and powerful. It is possible to use them in almost any application as a host board. They are suitable for embedded programming enthusiasts, Linux and Android gadget fans (they can just use the board as a media center or fully functional Linux-PC, for instance) and also professionals (since its low cost makes it very good solution for application-orientated embedded systems). The main usage of the board is software embedded development without the urge of understanding perfectly the hardware.

The strong points of the boards are the processor speed, the small form factor and the low price-to-productivity ratio.

Customers have full access to the technical documentation of the board. The software is released under General Purpose License and the board is considered open-hardware – all schematics and board design files are available to the customer under the Creative Commons Attribution-ShareAlike 3.0 Unported License.

1.3 Board variants

There are two major board variants named: A20-OLinuXino-MICRO and A20-OLinuXino-MICRO-4GB. The 4GB version has a built-in NAND memory suitable for the storage of an operating system without the need of a SD card. The 4GB version comes with already programmed Android 4.2.2 image.

The other Olimex boards with close characteristics are the ones with A13 and A10/A10s microcontrollers. The A13 boards feature a generation older processor but since they have been longer on the market they have better Linux and Android support. The A10/A10s boards feature single (than A20) processor core but they are more energy efficient making them better choices for handheld devices and devices requiring power efficiency.

Additional Android and Linux support and features are added overtime. The Linux support is a work in progress and you should not expect full Linux support after the initial volume of such boards have become available on the market. If you are in a hurry consider the older OLinuXino designs (which have almost everything supported, have examples available and so on).

1.4 Board version used in the manual

Boards from revisions E and F were used while writing this document. It is possible that they are outdated so it is always recommended to download the latest sources from the GitHub page of the board.

1.5 Organization

Each section in this document covers a separate topic, organized as follows:

- Chapter 1 is an overview of the board usage and features
- Chapter 2 provides a guide for quickly setting up the board and software notes
- Chapter 3 contains the general board diagram and layout
- Chapter 4 describes the component that is the heart of the board: the A20 – Allwinner processor

- Chapter 5 is an explanation of the control circuitry associated with the microcontroller
- Chapter 6 covers the connector pinout, peripherals and jumper description
- Chapter 7 provides the schematics and the dimensions of the board
- Chapter 8 contains the revision history, useful links and support information

CHAPTER 2: SETTING UP THE OLINUXINO BOARD

2. Introduction to the chapter

This section helps you set up the OLinuXino development board for the first time. Please consider first the electrostatic warning to avoid damaging the board, then discover the hardware and software required to operate the board.

The procedure to power up the board is given, and a description of the default board behavior is detailed.

2.1 Electrostatic and electrical polarity warning

OLinuXino is shipped in a protective anti-static package. The board must not be exposed to high electrostatic potentials. A grounding strap or similar protective device should be worn when handling the board. Avoid touching the component pins or any other metallic element.

If you connect other electrical devices to the A20 board make sure that they have equal electrical polarity. For example, when you connect an HDMI cable between a TV and the board it is a good idea to have them both connected to the same electrical source (to the same utility power socket). This might be said for a serial cable connected between a PC and the board's DEBUG port.
In rare cases different polarity might cause hardware damage to the board.

2.2 Requirements

In order to set up the A20-OLinuXino-MICRO optimally one or more additional items may be used. They might be generally placed in three categories:

Required – items that are needed in order to achieve minimum functionality;
Recommended – items that is good to have in order to be able to interact with the most important of the features of the board;
Additional – items that provide access to additional features or expand the features of the board.

Required items:
- USB type A to USB mini cable – to connect to a personal computer; used for powering the board and uploading new Android image to the NAND memory (if your board has 4GB NAND)
- Input device – either a mouse/keyboard or touchscreen LCD
- Output device – either HDMI cable + native HDMI monitor/screen/projector; or USB-SERIAL-CABLE-F + personal computer (for Linux and/or Android debugging); or OLIMEX LCD (TS) display + 40-pin CABLE-IDC40-15cm; or A20-VGA-CABLE + VGA monitor/screen/projector
- SD card with compatible image – if you have the board version with NO additional NAND memory you will need it to use one of the images available.

Recommended items:
- External USB hub – to split the USB_HOST mounted on the board; you need that to connect more USB devices
- External power supply unit – 6-16V DC, 5W required (10V @ 0.5A) – for optimal power

- USB-SERIAL-CABLE-F – for Android/Linux debugging on UART0
- CABLE-IDC40-15cm – cable used for LCD_CON ↔ Olimex LCD display
- Adapter cable for the 6-pin VGA connector to standard VGA 15-pin connector

Additional items include:
- Audio device for HEADPHONES jack
- Ethernet cable for wired Ethernet
- A number of extension modules that can add functionality or interface to the board on the UEXT connector; these can be explored here: https://www.olimex.com/Products/Modules/

Some of the above-suggested items can be purchased by Olimex, for instance:

SY0612E – reliable power supply adapter 50Hz (for EU) 12V/0.5A for A20-OLinuXino-MICRO
SY0612E-CHINA – cheaper power supply adapter 50Hz (for EU) 12V/0.5A for A20-OLinuXino-MICRO
A20-Android-SD – a tested class 10 micro SD card with the latest (by the time of leaving the Olimex facilities) official Android release
A20-Debian-SD – a tested class 10 micro SD card with the latest (by the time of leaving Olimex facilities) official Debian Linux release
USB-SERIAL-CABLE-F – USB serial console cable female
USB-MINI-CABLE – standard USB type A to USB type mini cable
A20-VGA-CABLE – adapter from 6-pin connector to 15-pin one
CABLE-IDC40-15cm – cable for LCD to LCD_CON connection
A13-LCD43TS – low-cost 4.3" LCD display with touchscreen component – 480×272
A13-LCD7 – low-cost 7" LCD display with optional touchscreen component – 800×480
A13-LCD10 – low-cost 10" LCD display with optional touchscreen component – 1024×600
SATA-HDD-2.5-500GB – 5GB 2.5" SATA hard disk
SATA-CABLE-SET – cables that allow the connection of a 2.5" hard disk to the board
ALUMINIUM-HEATSINK-20×20×6MM – heatsink radiator for better processor heat dissipation

2.3 Powering the board

There are three possible ways of powering A20-OLinuXino-MICRO-4GB – via external supply providing 6-16V DC at the power jack, from 5V USB port via USB_OTG connector or from 3.7V Li-Po battery via the LIPO_BAT. Note that the board consumes around 300mA of current at 12V when there are no peripherals connected to the USB hosts, so make sure the power supply is able to provide at least 500mA before plugging. Depending on your preferred way of powering you might need additional hardware.

Important: Not all USB ports would be able to provide enough power for the board. Try using another USB port/USB hub or a cable of higher quality. The best practice is not to count on the mini USB-OTG as a single power source!

The preferred way of powering the board is via the PWR jack with 6-16V DC with a power of 5W (e.g. 6Vx0.8A; 16Vx0.3A). This will make the board fully powered and able to power all the peripherals connected to it.

Note that when powering the board from the USB_OTG, the power provided might be insufficient to also power a bigger LCD connected to the LCD_con. However, this power option is capable of

driving the board when using external display connected to the HDMI connector.

The typical consumption of A20-OLinuXino-MICRO-4GB is between 100mA and 320mA depending on the current load and the power voltage applied.

If the board has entered power-down state you can bring it back without restart using the PWR_BUT. The PWR_BUT is also used to start the board when powered from a Li-Po battery on the battery connector.

Sometimes when starting Android it is possible the board to enter battery save mode even before booting fully. Especially, if you have turned off the board without quick boot mode enabled. In this case you should press the PWR_BUT for at least 5 seconds which would allow the board to start.

For the European customers we sell two power supply adapters, please check chapter 2.2. We also sell USB OTG to USB type A cables if you lack such.

The default username/password combination for the default Linux image on the SD card (if purchased) is: root/olimex.

Note that it is normal that when the board is powered some integrated circuits might appear hotter than others. This is perfectly normal for some chips – for instance – voltage regulators and the main processor.

2.4 Prebuilt software

The 4GB board-variant comes with Android 4.2.2 ready to use. The default settings of the software are followed. The default image works with HDMI monitor and 7" display.

How we have installed the software? Detailed information might be found in chapter *6.1.1 USB-OTG communication (NAND firmware repair/update).*

2.5 Changing the default image resolution

Depending on the display or the screen you want to use with the A10-OlinuXino-LIME, you might need to apply software changes to the prebuilt Android or Linux image.

Generally, this means that you would need to edit the configuration file script.bin and edit the settings inside. This file is usually located in Script.bin can't be opened in the binary format so you would need to convert it to .fex file format first. There are ready-to-use tools that convert script.bin <-> script.fex. Note that script.bin/fex contains configuration settings and definitions not only for the video output but also for the pin descriptions and names; power setting and much more. If you really want to modify and customize the default images (to change port functions, port names, to disable specific peripherals) you would need to be able to edit the script files. Please refer to the following web page for more information: http://linux-sunxi.org/Fex_Guide

The typical OlinuXino user would not need to edit the files, however.

To ease the process of changing the resolution we have compiled a number of Android images for the Android users (with hard-coded video output settings). Alternatively, for Debian Linux

users, we have provided a shell script that can be executed in order to set preferred video output and resolution.

For Android that you boot from the NAND memory you would need an image suitable for the specific resolution. Download locations to such images might be found at the wiki article for the A20 board here: https://www.olimex.com/wiki/A20-OlinuXino-MICRO.

For Linux Debian you would need to execute a shell script to be able to change the resolution. It is very good idea to use a serial cable for connection to the board from a personal computer since in this case you are dependent on a video resolution (a cable like USB-SERIAL-CABLE-F). When the board boots type:

./change_display*

or

./change_display_A20_OLinuXino.sh

and choose the resolution and the interface (LCD, HDMI or VGA).

The supported resolutions are:

For LCD:

1. 4.3" (480×272)
2. 7" (800×480)
3. 10" (1024×600)

For HDMI:

0. 480i
1. 576i
2. 480p
3. 576p
4. 720p50
5. 720p60
6. 1080i50
7. 1080i60
8. 1080p24
9. 1080p50
10. 1080p60

For VGA: (note that the VGA signals are routed to custom 6 pin connector and you need to from adapter to standard VGA connector, Olimex also sells such adapter cables)

0. 1680×1050
1. 1440×900
2. 1360×768
3. 1280×1024

4. 1024×768
5. 800×600
6. 640×480
7. 1920×1080
8. 1280×720

2.6 Calibrating a display

2.6.1 Android calibration

Calibrating a display under Android is pretty straightforward from the Android application.

Important: initially the boards are calibrated for a specific display. If you re-write the image (no matter whether the SD card or the NAND memory) you would need to use a mouse to calibrate the display initially. It might be impossible to calibrate it via touching the display.

2.6.2 Debian calibration

The command for display calibrating in Debian Linux is:

ts_calibrate

The default Debian setup is made with settings for HDMI 720p/60Hz. If you want to change some other LCD, VGA or HDMI resolution then you have to start script file in /root directory.

If the problem is under Debian Linux make sure you are properly logged in the XFCE interface! Else applying calibration would not happen for the current user – if you are calibrating from the X graphical interface make sure that you are logged as user “olimex” (if calibrating without the X, the user is “root”).

#su olimex

enter the password: olimex

calibrate the touch screen and reboot the board

#sudo reboot

2.7 Software support

We maintain Linux and Android images for SD card which might be downloaded for free and modified as the user wishes. The latest images and updates are featured at the wiki article of the device: https://www.olimex.com/wiki/A20-OLinuXino-MICRO.

2.8 Button functions and NAND image restore in Android

The bellow three buttons usually are supported under both Android and Debian:

PWR_BUT – used to perform software turn off, software turn on; used to turn on board when powered by battery – has to be held down for at least couple of seconds to perform each action
RESET – used for hardware reset of the board – it is not recommended
RECOVERY – used to wake up the board from sleep

The following buttons represent functions in the Android (it is possible that not all Android applications take advantage of the buttons, in such case the button would serve no purpose for that application):

VOL+ – increases the volume
VOL- – lowers the volume
MENU – brings up the main menu
SEARCH – brings up search feature
HOME – shows the home screen; note that HOME is also used to enter bootloader mode for firmware update
ESC – used to navigate away of a menu
ENTER – to select a choice

It is not recommended to disconnect the power supply (either the USB or the power jack) before turning off the Android from the either the menus or by holding PWR_BUT system written on the NAND.

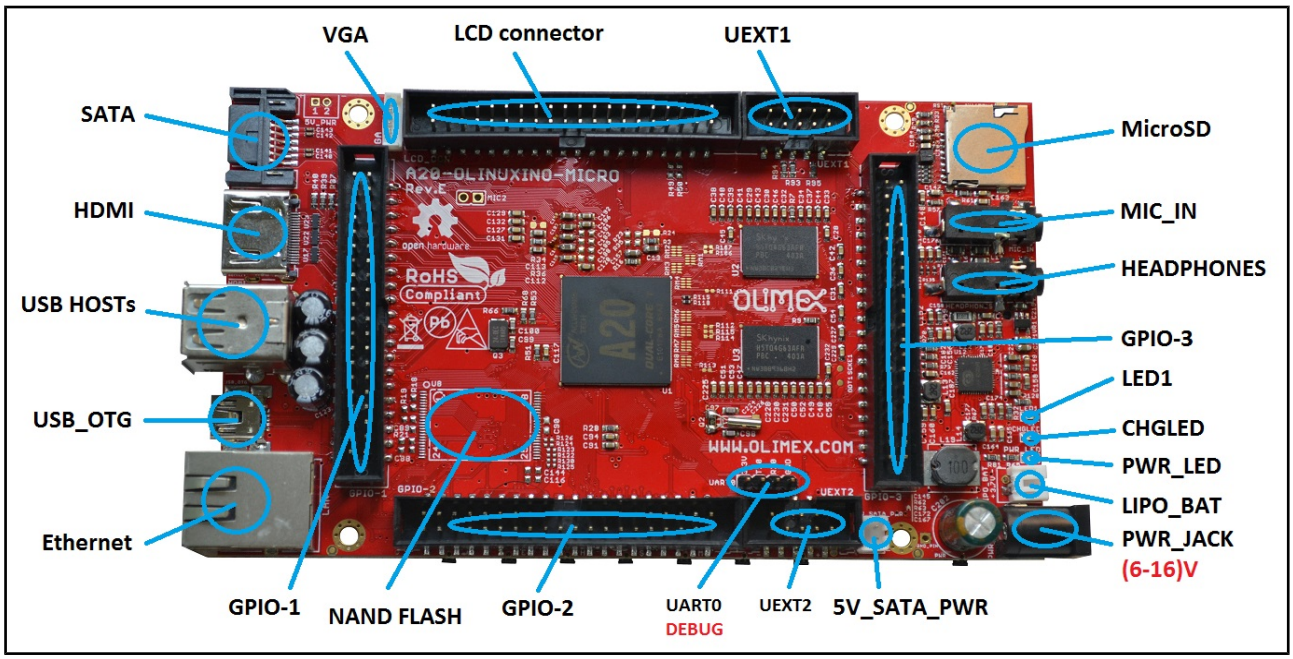
CHAPTER 3: A20-OLinuXino-MICRO BOARD DESCRIPTION

3. Introduction to the chapter

Here you get acquainted with the main parts of the board. Note the names used on the board might differ from the names used below to describe them. For the actual names check the A20-OLinuXino-MICRO board itself.

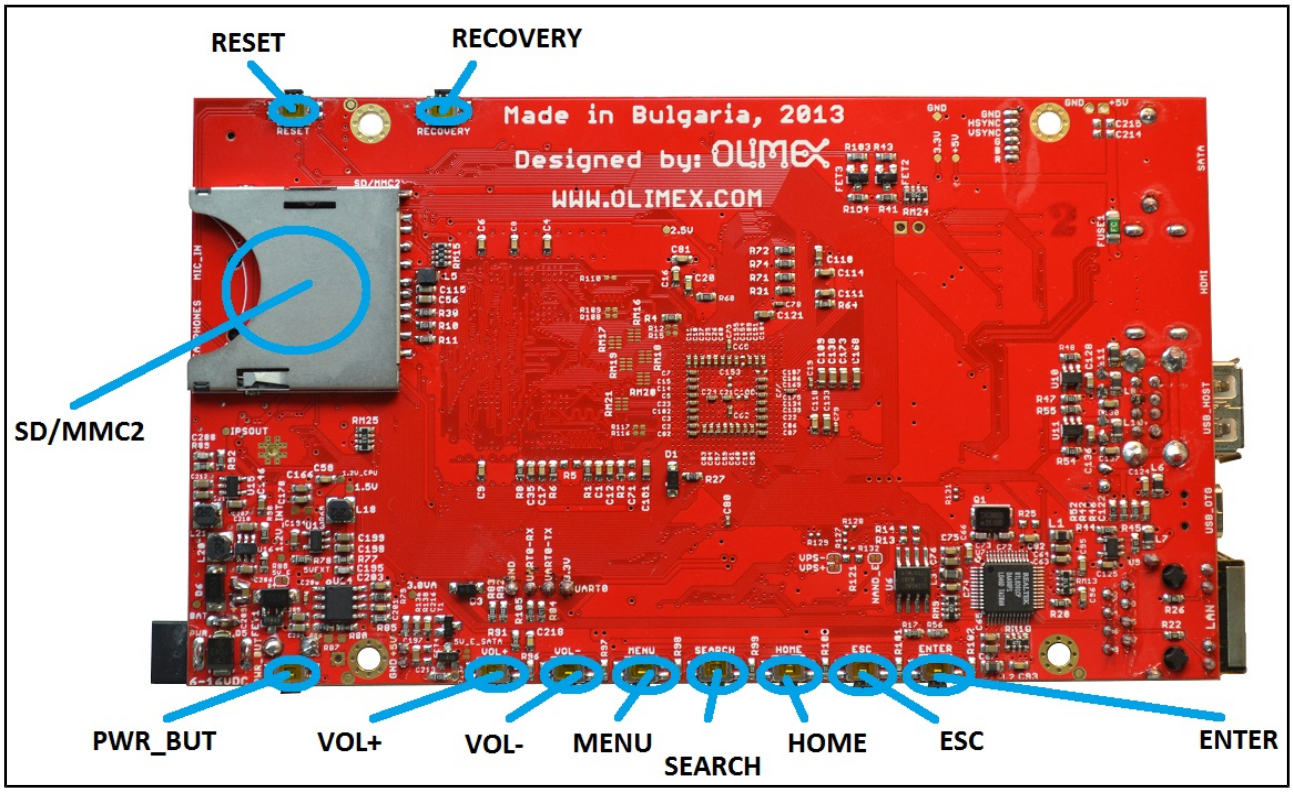
3.1 Layout (top view)

The picture below shows the initial revision of A20-OLinuXino-MICRO. Please note that the NAND memory is present only in the 4GB version of the board.



3.2 Layout (bottom view)

At the bottom of the board there are mainly buttons and the large SD/MMC connector.



CHAPTER 4: THE ALLWINNER A20 EMBEDDED PROCESSOR

4. Introduction to the chapter

In this chapter is located the information about the heart of OLinuXino – its microcontroller. The information is a modified version of the datasheet provided by its manufacturers.

4.1 The processor

The main feature of the A20 processor is the sheer computing power that allows FullHD video playback. The graphical processing unit is also pretty powerful and supported by the default software packages that come with the OlinuXino boards. The software support for the features in the processor is at pretty good state thanks to the efforts of the community and Allwinner themselves.

The full list of features might be found below:

- CPU
  - ARM® Cortex™-A7 Dual-Core

- GPU
  - ARM® Mali400MP2
  - Complies with OpenGL ES 2.0/1.1

- VIDEO
  - HD H.264 2160p video decoding
  - Multi-format FHD video decoding, including Mpeg1/2, Mpeg4 SP/ASP GMC, H.263, H.264,
  - VP6/8, AVS jizun, Jpeg/Mjpeg, etc.
  - H.264 High Profile 1080p@30fps or 720p@60fps encoding
  - 3840×1080@30fps 3D decoding, BD/SBS/TAB/FP supported
  - Complies with RTSP, HTTP, HLS, RTMP, MMS streaming media protocols

- DISPLAY
  - Supports multi-channel HD display
  - Integrated HDMI 1.4 transmitter with HDCP support
  - CPU/RGB/LVDS LCD interface
  - Supports CVBS/YPbPr/VGA
  - Integrated TV decoder

- CAMERA
  - Integrated parallel 8-bit I/F YUV sensor
  - Integrated 24-bit parallel YUV 444 I/F
  - Supports 5M CMOS sensor
  - Supports dual sensors

- MEMORY
  - DDR2/DDR3/DDR3L controller

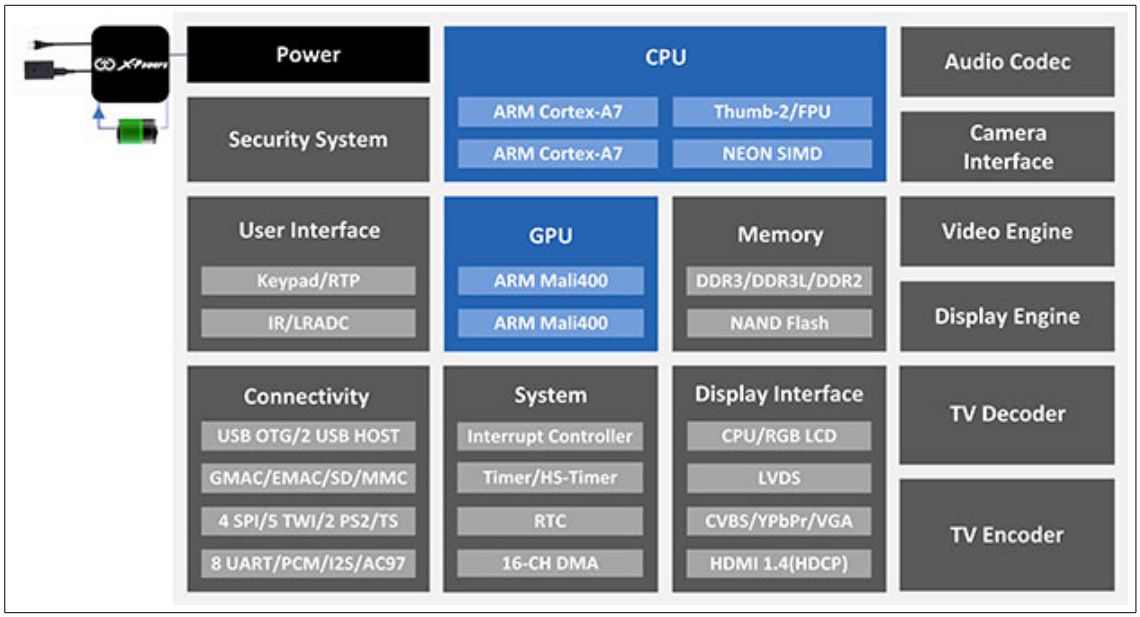
- NAND Flash controller with 64-bit ECC

- AUDIO
  - Integrated HI-FI 100dB Audio Codec
  - Dual analog mic amplifiers

More information can be found on Allwinner's web site at the following web-address:
http://www.allwinnertech.com/en/product/A20.html

4.2 Block diagram

The block diagram is taken from Allwinner's web-site.



CHAPTER 5: CONTROL CIRCUITY

5. Introduction to the chapter

Here you can find information about reset circuit and quartz crystals locations, the power supply circuit is discussed.

5.1 Reset

The board has hardware reset controlled by the AXP209 power system management IC.

The board should be turned off the standard OS menu (that might be invoked by holding POWER button or “poweroff” command under Debian) and after the choice is confirmed it is safe to be disconnected from the power supply unit.

5.2 Clocks

25 MHz quartz crystal Q1 is connected to pins X1 and X2 of the RTL8201CP Ethernet controller.

32 768 Hz (RTC) quartz crystal Q2 is found at pins F1 and F2 of the A20 microcontroller.

24 MHz quartz crystal Q3 is found at pins N22 and N23 of the A20 microcontroller.

5.3 Power supply circuit

The power supply is handled mainly by AXP209 power management system, an Allwinner chip that goes together with the A20 processor. It is mounted on the board but since it is relatively hard to find we also sell it separately.

The power supply circuit of A20-OLinuXino-MICRO requires input supply of 6-16V. The minimum wattage is 5W, and this threshold may raise if using a lot of devices on the USB-HOST (via external hub), a lot of GPIOs and the LCD_CON.

CHAPTER 6: CONNECTORS AND PINOUT

6. Introduction to the chapter

In this chapter are presented the connectors that can be found on the board all together with their pinout and notes about them. Jumpers functions are described. Notes and info on specific peripherals are presented. Notes regarding the interfaces are given.

6.1 Communication with the A20

The direct communication method is via the serial interface. Through male UART0 connector capable of delivering some information on the COM port of your computer – and then use your favorite terminal program (puTTy, teraterm, etc) to receive the data/send commands. You can use USB-SERIAL-CABLE-F with the UART0 interface allowing you to connect to a personal computer with a free USB port.

Note that the levels at board's UART0 are in CMOS level and you would need a MAX232 convertor to bring them to TTL one!

It is highly recommended to own a USB-SERIAL-CABLE-F (or similar product) at hand when debugging – the video output is not always reliable and if you set wrong display settings you might be unable to recover the settings without a proper UART0 connection.

The more indirect ways of communicating with the board are via peripheral devices – mouse and keyboard, via a touch screen LCD that is connected on LCD_CON connector and others.

6.1.1 USB-OTG communication (NAND firmware repair/update)

The main way of changing the firmware image located on the NAND of A20-OLinuXino-MICRO-4GB is via the USB-OTG connector.

We have configured an Android image with settings suitable for A20-OLinuXino-MICRO. Then using PhoenixSuit tools we uploaded the image to the board via the USB OTG. The image is available for users to try and tweak the settings. The images can be downloaded from the wiki article at: https://www.olimex.com/wiki/A20-OLinuXino-MICRO.

The board variant without NAND needs an SD card with bootable OS – Android or Linux. There are ready images available for download at the above-linked A20 wiki article.

To repair the image on NAND re-upload it following these easy steps:

1. Install and run PhoenixSuit (can be found in the wiki article for A20).

2. Go to firmware tab of the program and point to a valid Android image (the latest official one may also be downloaded from the A20 wiki article).

3. Disconnect the power supply and USB cable from the A20 board.

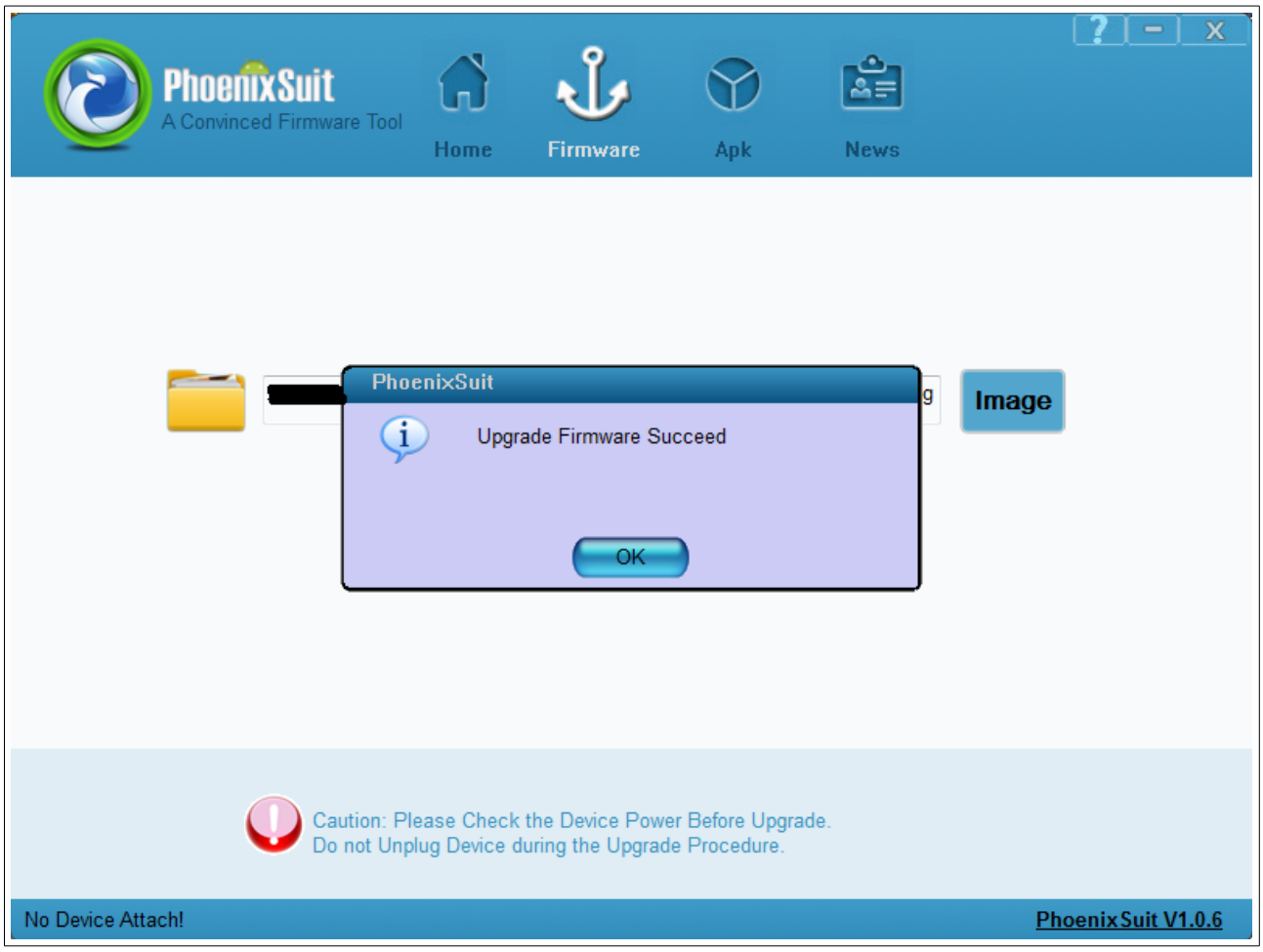
4. Press and hold RECOVERY button, apply power supply (6-16)V, release RECOVERY button.

5. Connect USB cable to the mini USB connector

6. You will be asked for drivers for the bootloader. Navigate to the folder where you extracted the PhoenixSuit and install the drivers from the respective executables (or manually point the installer to the drivers folder in the PhoenixSuit installation path).

7. PhoenixSuit will detect the board and would ask for the method of writing the image. Choose method of writing the image and confirm your wish to write the image.

8. Wait till upgrade succeeds as shown below:



There are different flavors of the Android and Linux distributions depending on whether you want to use 50Hz HDMI or 60Hz HDMI or VGA or 7" display or 10" display etc. You might need to change the configuration files inside (depending on your desirable output medium). How to do it is explained in chapter 2.6 Calibrating a display.

Those images, the software required and further instructions might be found at the wiki page: https://www.olimex.com/wiki/A20-OLinuXino-MICRO.

6.1.2 UART0, UEXT1, UEXT2 interface

The UART0 might be used for UART communication by default. It is typically used for serial/terminal debug. The UEXTs are typically used for connecting additional modules.

Note that by default only UART0 is defined as a port suitable for serial debug. You can use our USB-SERIAL-CABLE-F for debugging. UEXT1 and UEXT2 are NOT defined by default.

Consider table below when connecting the USB-SERIAL-CABLE-F according to the wire color code. The RX line of the cable (GREEN wire) should go to TX line of the target board; the TX line of the cable (RED wire) should go to the RX line of the target board. The BLUE wire should go to the target's GND line.

UART0		
Pin #	**Signal name**	**Processor pin**
1	3.3V	-
2	UART0-TX	A7
3	UART0-RX	B7
4	GND	-

UEXT1			
Pin #	**Signal name**	**Pin #**	**Signal name**
1	3.3V	**2**	GND
3	UART6-TX	**4**	UART6-RX
5	TWI2-SCK	**6**	TWI2-SDA
7	SPI2-MISO	**8**	SPI2-MOSI
9	SPI2-CLK	**10**	SPI2-CS0

UEXT2			
Pin #	**Signal name**	**Pin #**	**Signal name**
1	3.3V	**2**	GND
3	UART7-TX	**4**	UART7-RX
5	TWI1-SCK	**6**	TWI1-SDA
7	SPI1-MISO	**8**	SPI1-MOSI
9	SPI1-CLK	**10**	SPI1-CS0

The UEXT connectors are used as an interface for the Olimex's UEXT modules (usually boards with MOD- prefix in their commercial names). For more information on UEXT please visit: https://www.olimex.com/Products/Modules/UEXT/resources/UEXT.pdf

6.2 SD card connectors

There are two SD card connectors on this A20 board. The now common microSD card connector is located on the top of the board, near the audio in/out connectors.

Note that by default only the micro SD card slot might be used for booting the OS.

However, due to popular demand, there is also an SD/MMC card connector located on the bottom of the board.

Both SD slots might be used simultaneously – there is no data multiplexing lines. For instance – one of them might be used for booting the OS, the other – for saving data.

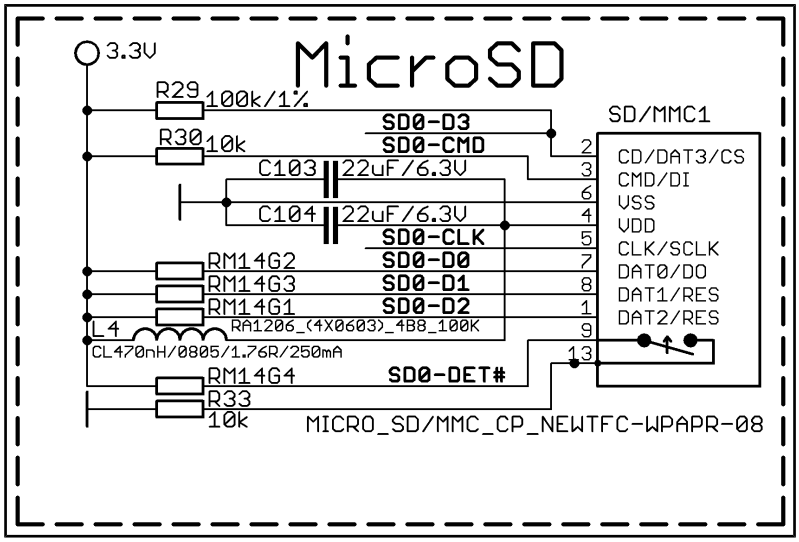
As a general precaution be careful with the SD cards you purchase. There is a big percentage of fake cards due to the low effort required to counterfeit popular brands and the big demand for SD cards worldwide. When in doubt – try the same operation with another card from another brand.

Olimex sells microSD cards with Linux or Android images, that have been tested – please refer to chapter “2.2 Requirements”. Of course, if you already have a large enough microSD card you can download the official Linux image from the wiki pages: https://www.olimex.com/wiki/A20-OLinuXino-MICRO.

When removing the card, please make sure that you release it from the connector by pushing and NOT by pulling the card directly (this can damage both the connector and the microSD card).

6.2.1 SD/MMC1 slot

The schematic related to the SD/MMC1 (microSD connector) is shown below:



SD/MMC1 slot is the “smaller” microSD card slot, located on the top of the board.

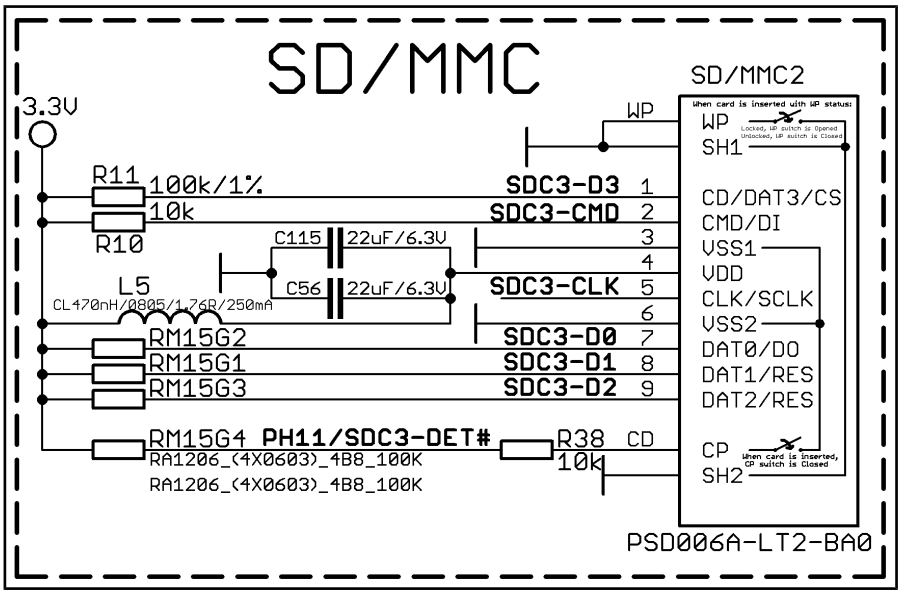
This slot is typically used for booting the OS, due to the larger capacities of the microSD cards (compared to SD or MMC cards). It is suggested to have an SD card with a proper Linux/Android

image especially if you have ordered a version of the board without NAND memory. It is also recommended to use Class 10 (10MByte/sec) card for faster read/write operations, lower class cards (especially higher capacity ones) might slow down the whole system.

microSD card connector		
Pin #	Connector signal name	Wire name (processor pin)
1	DAT2/RES	SD0-D2 (K19)
2	CD/DAT3/CS	SD0-D3 (K20)
3	CMD/DI	-
4	VDD	-
5	CLK/SCLK	SD0-CLK(L20)
6	VSS2	-
7	DAT0/DO	SD0-D0(M19)
8	DAT1/RES	SD0-D1(M20)

6.2.2 SD/MMC slot

The schematic related to the SD/MMC1 (SD/MMC connector) is shown below:



The SD/MMC2 slot is located on the back of the PCB and works with the “larger” SD and MMC cards. The connector was mounted to to popular demand.

Note that by default this connector is not suitable for booting OS. Such support is possible but not implemented in the official software releases.

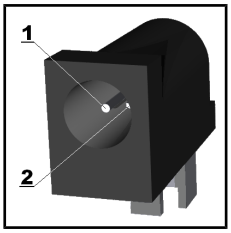
SD/MMC card connector		
Pin #	Connector signal name	Wire name (processor pin)
1	CD/DAT3/CS	SDC3-D3 (B16)
2	CMD/DI	SDC3-CMD (A18)
3	VSS1	-
4	VDD	-
5	CLK/SCLK	SDC3-CLK (B18)
6	VSS2	-
7	DAT0/DO	SDC1-D0 (A17)
8	DAT1/RES	SDC1-D1 (B17)
9	DAT2/RES	SDC1-D2 (A16)

Additionally, there are the WP and CP switches that are responsible, respectively, for sensing whether the card is locked for reading and whether there is a card inserted.

6.3 PWR jack

The power jack used is the typical 2.5mm one used by Olimex in most of our products. You should provide 6 to 16 volts direct current and the required current may vary depending on the peripherals connected to the board. The power supply you use should be capable of providing at least 500mA of current.

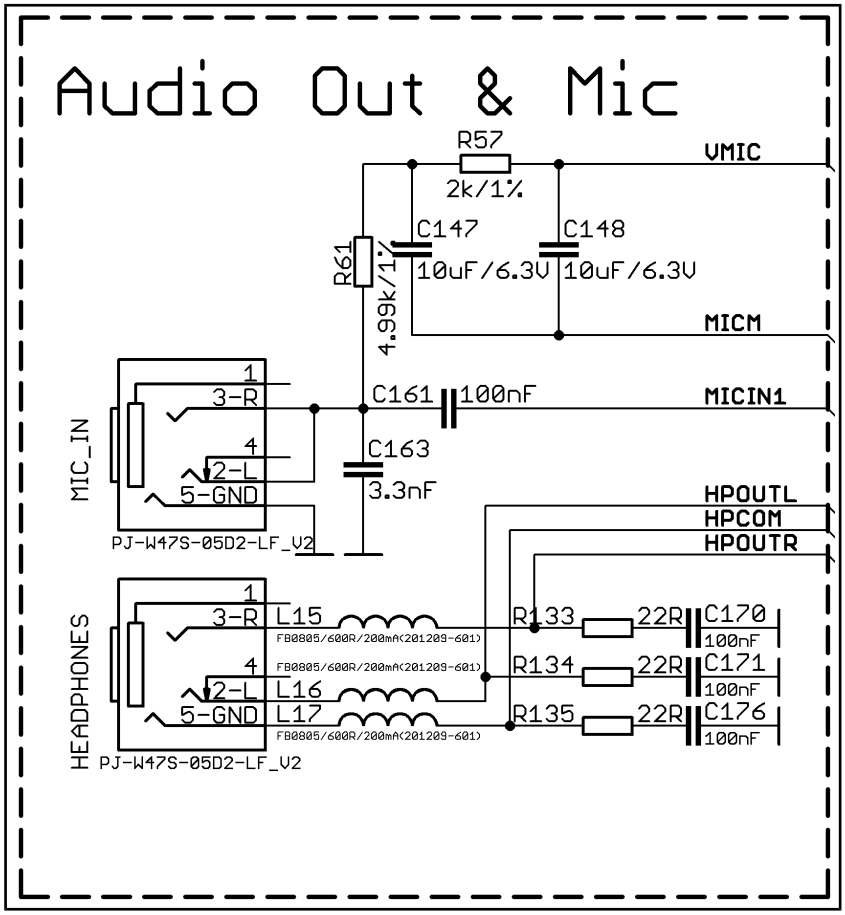
Pin #	Signal name
1	Power input
2	GND



More info about the power supply can be found in chapter 5 of this manual.

6.4 MIC_IN & HEADPHONES connectors

The part of the schematic related to those connectors is listed below:

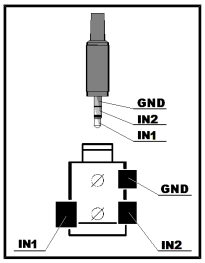


Standard MIC_IN jack is mounted for audio input to the board. Note that it is a single channel MIC_IN. The MIC_IN is a mono input.

MIC_IN connector		
Pin #	**Signal name**	**Processor pin**
2	MICIN	AC20
3	MICIN	AC20
5	GND	-

The socket can interface standard 3.5 mm phone connector (also known stereo plug or audio plug).

Headphones connector		
Pin #	**Signal name**	**Processor pin**
2	HPOUTL	Y19
3	HPOUTR	W19
5	HPCOM (GND)	AA19, AA20

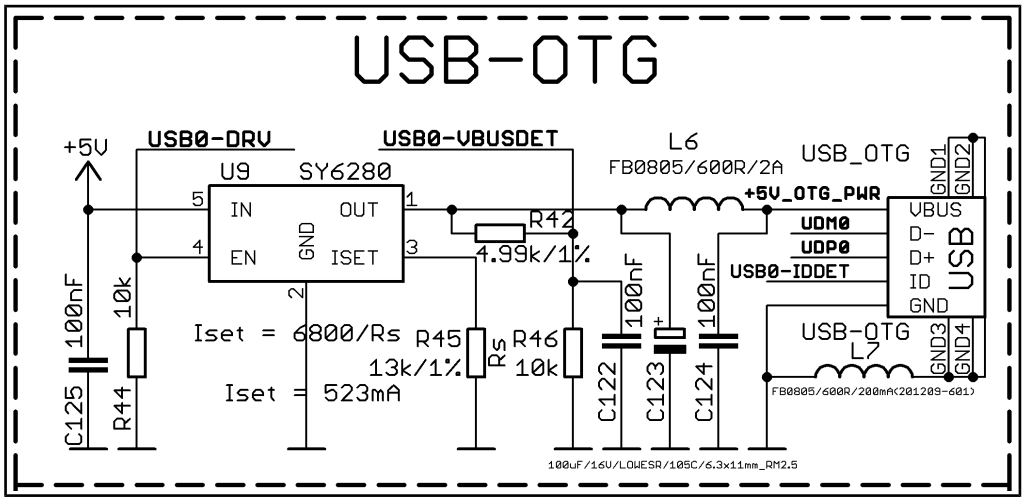


The connector can interface standard 3.5 mm phone connector (also known stereo plug or audio plug).

The default audio output is set to the HDMI connector (for displays and monitors with built-in audio speakers). If you wish to use audio out you need to first disconnect the HDMI, boot the board, connect the audio out device (speakers) and finally connect the HDMI.

6.5 USB_OTG connector

The part of the schematic related to the USB_OTG is shown below:



The USB_OTG features Low Loss Power Distribution Switch SY6280 which protects the board in case the devices you have plugged to the USB_OTG attempt to draw more current than 523mA combined. The maximum current available on the 5V USB_OTG is exactly 523mA.

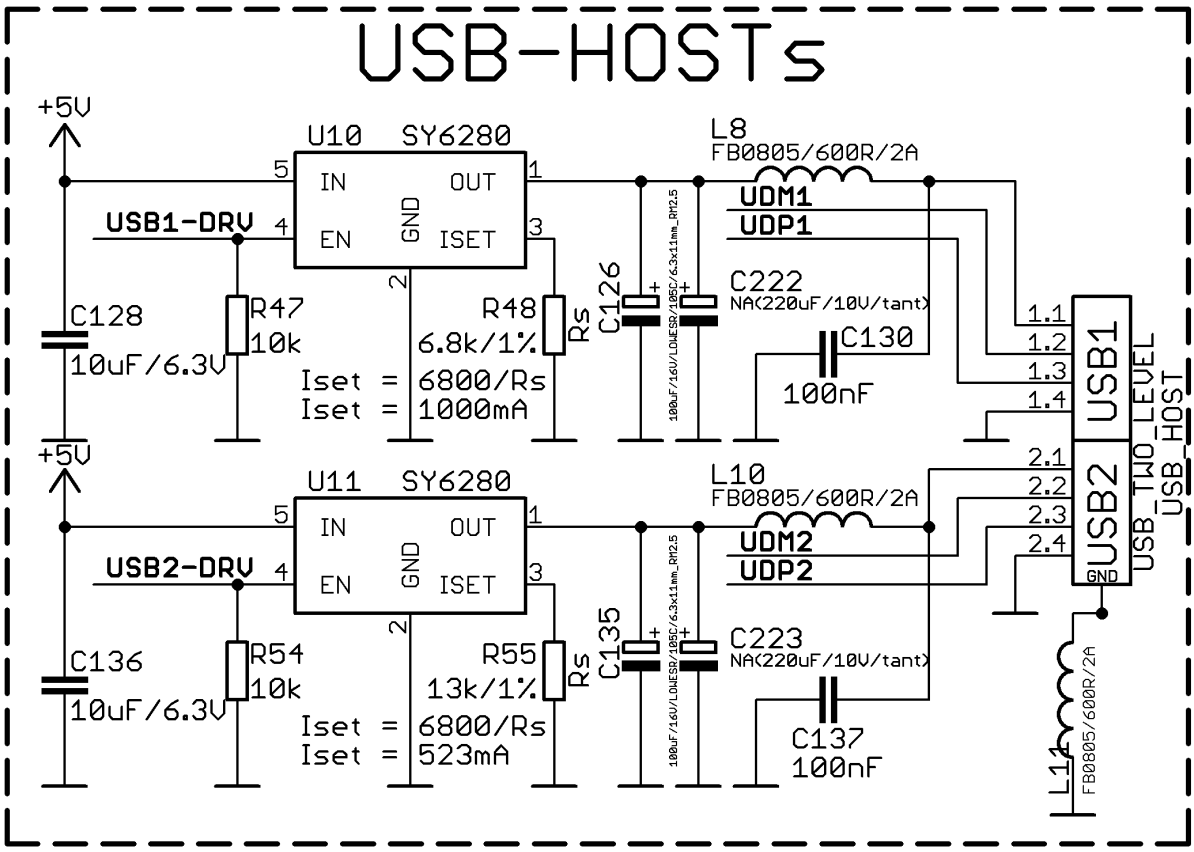
The SY6280 responsible for the USB_OTG is enabled by USB0-DRV (processor pin C12), thus the USB_OTG is also controlled by the same signal.

USB_OTG connector		
Pin #	**Signal name**	**Processor pin**
1	+5V_OTG_PWR	-
2	UDM0	N20
3	UDP0	N21
4	USB0-IDDET	B5
5	GND	-

The connector case is also grounded.

6.6 USB_HOST connector

The part of the schematic related to the USB_HOST connector is listed below:



The USB_HOST connector features two levels – called USB1 and USB2 in the schematic. The connector is situated between the USB_OTG and the HDMI connector. Each of slots them features a low loss power distribution switch SY6280 which protects the board in case the devices you have plugged to each level USB_HOST try to draw more than the allowed current.

Please note the pads of capacitors C222 and C223 where you can solder tantalum capacitors (220uF/18V). If you do so you would be able to increase the stability of the powering by the USB ports when the powered device has high current consumption.

The maximum current available on each slot of the 5V USB_HOST is different! USB1 is capable of providing 1000mA of current; while USB2 is capable of providing only 523mA. If you have a device that draws higher current please plug it into USB1.

The SY6280 responsible for the USB1 is enabled by USB0-DRV1 (processor pin A4).

The SY6280 responsible for the USB2 is enabled by USB0-DRV2 (processor pin A5).

USB_HOST two-level connector					
Pin #	**Signal name**	**Processor pin**	**Pin #**	**Signal name**	**Processor pin**
1.1	5V	Connected to SY628	**2.1**	5V	Connected to SY628
1.2	UDM1	P20	**2.2**	UDM2	R20
1.3	UDP1	P21	**2.3**	UDP2	R21
1.4	GND	-	**2.4**	GND	-

The GND is common for both levels of the USB_HOST.

6.7 Ethernet

The LAN connectivity is handled by Realtek's RTL8201CP. Some of the features of this 10/100Mbit controller are:

- 10/100Mbps operation
- Full/half duplex operation
- Supports auto crossover detection
- Adaptive equalization
- IEEE 802.3/802.3u compliant
- Supports IEEE 802.3u clause 28; 1.8V
- Operation with 3.3V IO signal tolerance

and much more

The Ethernet connector is grounded according to the standard (check GND1 and GND2 lines on the schematics).

If you use Linux then the Ethernet connector might be used for SSH connection to the board. If you lack any other option for debugging it might be hard to guess the correct IP of the board since it has DHCP enabled by default (especially if you are in a large network). It is good idea to check the default settings by exploring the Linux image settings. Those are usually stored in:

/etc/network/interfaces

For DHCP you need to enable auto detection and dhcp as shown below:

```
auto eth0
iface eth0 inet dhcp
```

For setting a static address please follow the pattern below:

```
auto eth0
iface eth0 inet static
address 192.168.1.5
netmask 255.255.255.0
```

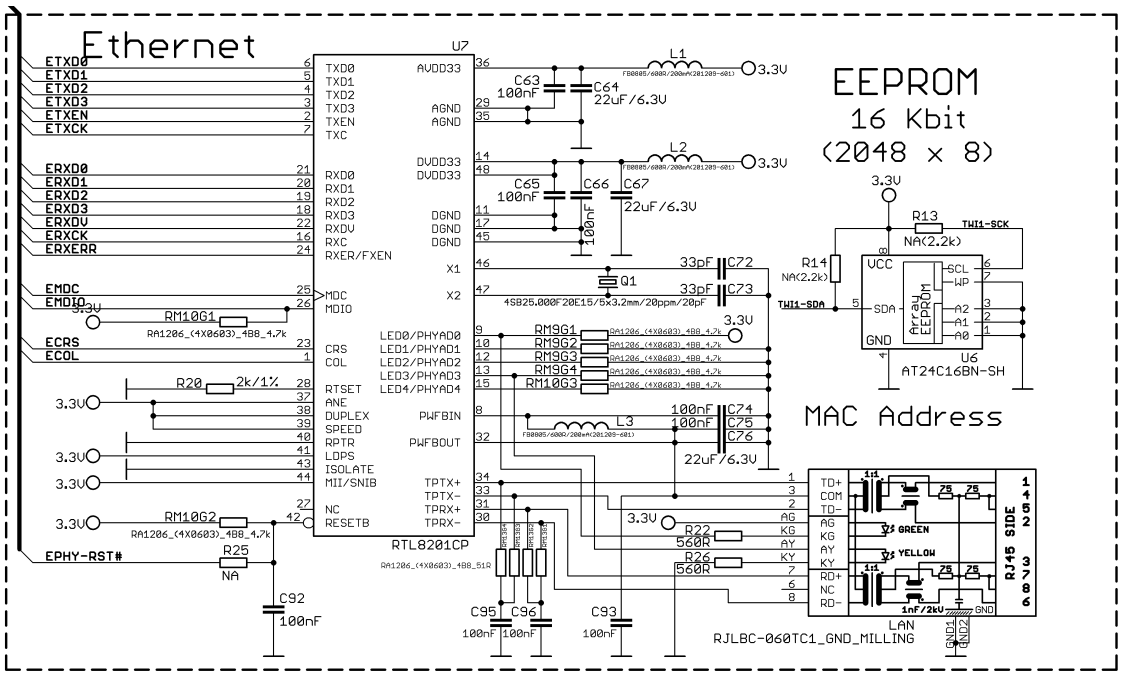
gateway 192.168.1.254

The EEPROM memory may be used to store the MAC address.

Important: In some Debian images it is possible that the Ethernet doesn't get auto-detected during boot-up. This is done on purpose because if there is auto-detection enabled and you don't want to use the Ethernet connector or you have forgotten to plug a cable the start-up would be greatly delayed. This might be problem in the first start-up to users counting only on SSH connection. You can enable the Ethernet after a successful boot-up with:

```
ifconfig -a
dhclient eth#(as seen after after the ifconfing command)
```

Important: You can configure static/DHCP-given IP addresses in /etc/network/interfaces

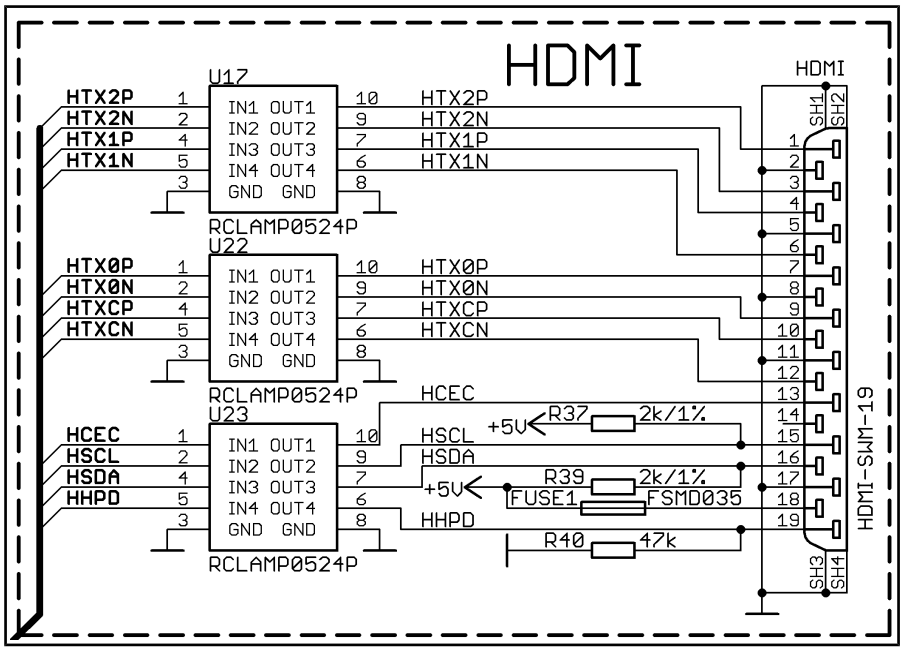


Ethernet	
Pin #	**Signal name**
1	TD+
2	TD-
3	VDD
4	NC
5	NC
6	VDD
7	RD+
8	RD-

LED	Color	Usage
Right	Green	Link status
Left	Yellow	Activity status

6.8 HDMI connector

The part of the schematic that describes the HDMI module is shown below:



Note that there are different Linux images depending whether the HDMI TV works at 50Hz or 60Hz refresh rate. If you board runs Android there is a specific option to set the appropriate HDMI output.

HDMI connector					
Pin #	**Signal name**	**Processor pin**	**Pin #**	**Signal name**	**Processor pin**
1	HTX2P	T23	**11**	GND	-
2	GND	-	**12**	HTXCN	W22
3	HTX2N	T22	**13**	HCEC	P23
4	HTX1P	U23	**14**	NA*	NA
5	GND	-	**15**	HSCL	R23
6	HTX1N	U22	**16**	HSDA	R22
7	HTX0P	U23	**17**	GND	-
8	GND	-	**18**	+5V	-
9	HTX0N	U22	**19**	HHPD	P22
10	HTXCP	W23			

*Pin 14 of the HDMI is not mandatory. In HDMI 1.0-1.3c it is reserved pin; in HDMI 1.4+ it is optional.

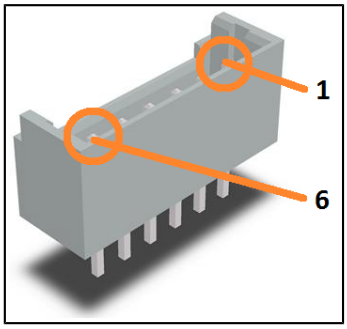
6.9 VGA connector

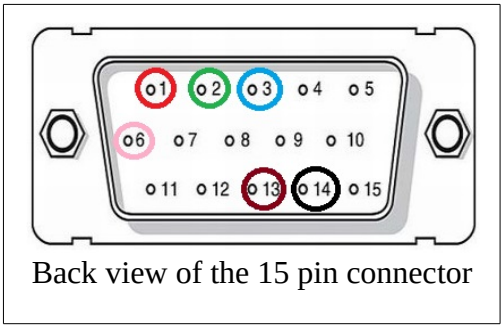
You would probably need an adapter cable for the VGA display (6-pin connector to 15-pin female RGB cable). You can make the cable or the connection yourself or you can purchase the Olimex-made cable: https://www.olimex.com/Products/Components/Cables/A20-VGA-CABLE/.Note that you also have to change the script under Debian as explained in chapter 2.6 “Calibrating a display”.

Please note that you would need a specific Android image for the VGA output (with proper display and output settings). **We don't provide such image ready at the moment!**

The VGA output has been tested only with the official Debian Linux image so far and it works fine (after selecting the proper mode by executing ./change_display*.sh).

VGA 6-pin connector			VGA 15-pin connector (back numbering)	
Connector pin #	Signal name	Processor pin	Connector pin # (back numbering)	Color code (according to the image below)
1	VGA-R	AC17	1	RED
2	VGA-B	AB16	3	BLUE
3	VGA-G	AC16	2	GREEN
4	VGA_VSYNC	AC9	14	BLACK
5	VGA_HSYNC	AB9	13	BROWN
6	GND	-	6	PINK



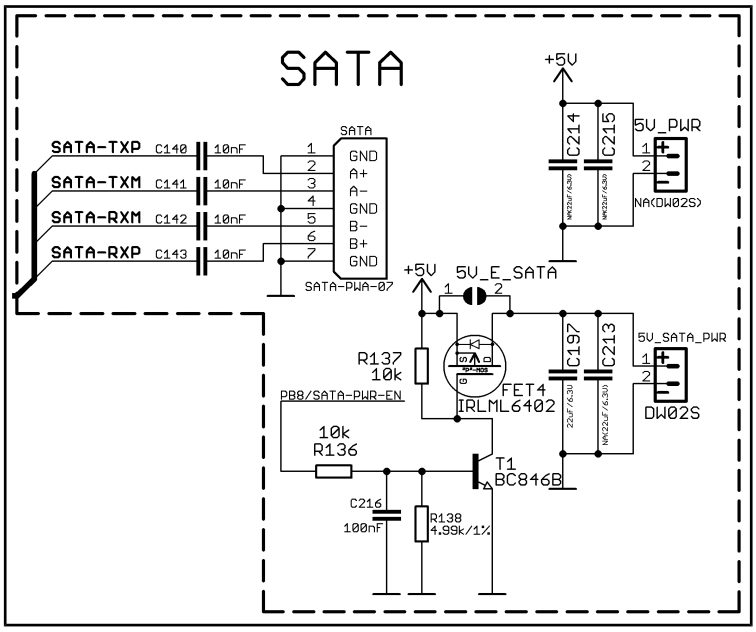


Back view of the 15 pin connector

6.10 SATA connector and power

The part of the schematic describing the SATA module is shown below:

SATA connector		
Pin #	Signal name	Processor pin
1	GND	-
2	SATA-TXP	T20
3	SATA-TXM	T21
4	GND	-
5	SATA-RXM	U21
6	SATA-RXP	U20
7	GND	-



6.11 GPIO-1 (General Purpose Input/Output) 14pin connector**

The GPIO-1 plastic connector has 14 pins. The signal layout is described below:

GPIO-1 connector					
Pin #	Signal name	Processor pin	Pin #	Signal name	Processor pin
1	+5V	-	2	GND	-
3	+3.3V	-	4	GND	-
5	PG0	F20	6	VOL+_BUT	AB23***
7	PG1	E21	8	VOL-_BUT	AB23***
9	PG2	E20	10	MENU_BUT	AB23***
11	PG3	D21	12	SEARCH_BUT	AB23***
13	PG4	D20	14	HOME_BUT	AB23***
15	PG5	C21	16	ESC_BUT	AB23***
17	PG6	E19	18	ENTER_BUT	AB23***
19	PG7	C20	20	TVOUT3	AB17
21	PG8	D19	22	TVIN0	AC18
23	PG9	C19	24	TVIN1	AB18
25	PG10	D18	26	TVIN2	AA17
27	PG11	C18	28	TVIN3	Y17
29	VGA_HSYNC	AB9*	30	LINEINR	AB21
31	VGA_VSYNC	AC9*	32	LINEINL	AB20
33	VGA-G	AC16*	34	FMINR	Y21
35	VGA-B	AB16*	36	FMINL	Y20

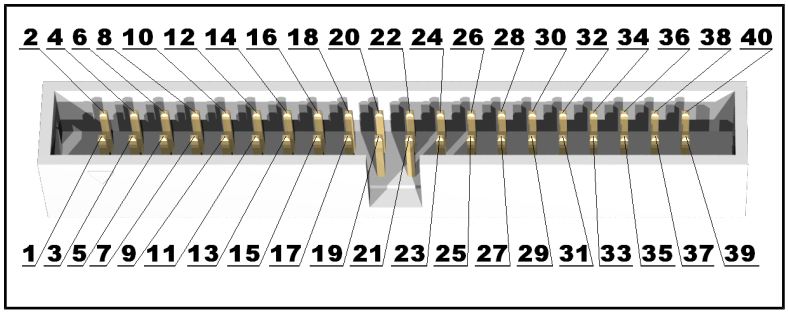
37	VGA-R	AC17*	38	MIC1OUTP	AC22
39	LRADC1	AB22*	40	MIC1OUTN	AC23

**Signals marked with * are multiplexed with either a peripheral device or another connector. Ensure that the multiplexing is handled properly on software and/or hardware level (else there would probably occur wrong levels, loss of data, etc).*
***It was erroneously named GPIO-4 in the first release of the board.*
****All Android buttons are connected to an ADC (LRADC) that uses a divider to determine which button is pressed.*

The yellow part of the table shows all the signals shared with the 6-pin VGA connector.

6.12 GPIO-2 (General Purpose Input/Output) 40pin connector

The GPIO pins are led out on a separate 40pin connecter. They allow the user to attach additional hardware, check readings or perform hardware debug. The GPIO-2 connector numbers are printed at the bottom of the board for your convenience.



GPIO-2 connector					
GPIO pin#	Signal name	Processor pin#	GPIO pin#	Signal name	Processor pin#
1	5V	-	2	GND	-
3	3.3V	-	4	GND	-
5	TWI0-SCK	A15	6	PE0	E23
7	TWI0-SDA	B15	8	PE1	E22
9	PI0	A20	10	PE2	D23
11	PI1	B20	12	PE3	D22
13	PI2	A19	14	PE4	C23
15	PI3	B19	16	PE5	C22
17	PI10	C17	18	PE6	B23
19	PI11	D17	20	PE7	B22
21	PC3/NCE1	L22*	22	PE8	A23
23	PC7/NRB1	J22*	24	PE9	A22
25	PC16	M21	26	PE10	B21
27	PC17	F23	28	PE11	A21
29	PC18	F22	30	PI14	C15
31	PC23	G19	32	PI15	D15
33	PC24/NQS	F21*	34	UART0-RX	B7*
35	GPIO1	-	36	UART0-TX	A7*
37	GPIO2	-	38	NMI_N	F5
39	GPIO3	-	40	RESET_N	C14

*Signals marked with * are multiplexed with either a peripheral device or another connector. Ensure that the multiplexing is handled properly on software and/or hardware level (else there would probably occur wrong levels, loss of data, etc).*

6.13 GPIO-3 (General Purpose Input/Output) 10pin connector

GPIO-3 connector features the signals of AXP152 on a convenient header. The signals available might be used to implement power controls on the board – for instance – turning off the device at specific voltage level or detecting levels.

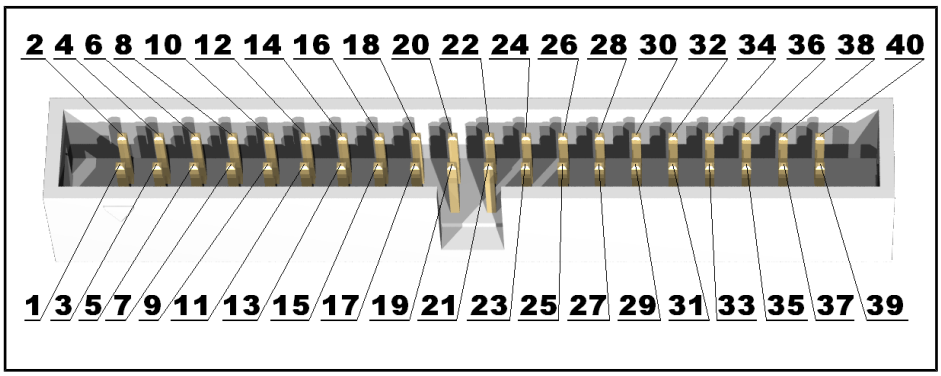
GPIO-3 connector					
GPIO pin#	**Signal name**	**Processor pin#**	**GPIO pin#**	**Signal name**	**Processor pin#**
1	5V	-	**2**	GND	-
3	3.3V	-	**4**	GND	-
5	PH0	A6	**6**	PB3	B14
7	PH2/LED	C6	**8**	PB4	A13
9	PH7	B4	**10**	PB5	B13
11	PH9	D4	**12**	PB6	A12
13	PH10	A3	**14**	PB7	B12
15	PH11/SDC3-DET#	B3*	**16**	PB8/SATA-PWR-EN	A11
17	PH12	C3	**18**	PB10	C11
19	PH13	A2	**20**	PB11	C10
21	PH14	B2	**22**	PB12	C9
23	PH15	A1	**24**	PB13	B11
25	PH16	B1	**26**	PB14	A10
27	PH17	C1	**28**	PB15	B10
29	PH18	C2	**30**	PB16	A9
31	PH19	D1	**32**	PB17	B9
33	PH20	D2	**34**	PH24	E3
35	PH21	D3	**36**	PH25	E4
37	PH22	E1	**38**	PH26	F3
39	PH23	E2	**40**	PH27	F4

*Signals marked with * are multiplexed with either a peripheral device or another connector. Ensure that the multiplexing is handled properly on software and/or hardware level (else there would probably occur wrong levels, loss of data, etc).*

6.14 LCD_CON 40pin connector

The LCD_CON pins are led out on a separate 40pin connecter for the ease of connecting an LCD. We have tested the ability of the board to interact with such a display. They allow the user to attach additional hardware, check readings or perform hardware debug.

Important: you need additional 40PIN ribbon cable to connect an Olimex display and the LCD_CON.



LCD_CON connector					
GPIO pin#	Signal name	Processor pin	GPIO pin#	Signal name	Processor pin
1	+5V	-	2	GND	-
3	+3.3V	-	4	GND	-
5	LCD_D16	Y12	6	LCD_D17	AA12
7	LCD_D18	Y11	8	LCD_D19	AA11
9	LCD_D20	Y10	10	LCD_D21	AA10
11	LCD_D22	AB12	12	LCD_D23	AC10
13	LCD_D8	AB11	14	LCD_D9	AC11
15	LCD_D10	Y15	16	LCD_D11	AA15
17	LCD_D12	Y14	18	LCD_D13	AA14
19	LCD_D14	Y13	20	LCD_D15	AA13
21	LCD_D0	AB15	22	LCD_D1	AC15
23	LCD_D2	AB14	24	LCD_D3	AC14
25	LCD_D4	AB13	26	LCD_D5	AC13
27	LCD_D6	AB12	28	LCD_D7	AC12
29	LCD_HSYNC	AB9	30	LCD_VSYNC	AC9
31	LCD_CLK	Y9	32	LCD_DE	AA9
33	PB3	B14	34	PB4	A13
35	LCD_PWR	C4	36	PB2/PWM0	A14*
37	TPX1	Y22	38	TPX2	AA22
39	TPY1	Y23	40	TPY2	AA23

*Signals marked with * are multiplexed with either a peripheral device or another connector. Ensure that the multiplexing is handled properly on software and/or hardware level (else there would probably occur wrong levels, loss of data, etc).*

The LCD connector is suitable for a number of Olimex displays and touchscreen panels with different native resolution – the smallest available is the **4.3''** one called **A13-LCD43TS** with native screen resolution of **480×272**, through the **7''** one named **A13-LCD7** with **800×480**, to the **1024×600 10.1'' A13-LCD10.**

IMPORTANT:

To use Android with display or resolution different than HDMI and 1024×600 (default settings) you need to upload new Android image to the board. These images are available here: https://www.olimex.com/wiki/A20-OLinuXino-MICRO (using an operating system – NAND flash).

In Debian Linux you would need to start a start a shell script to change the built-in the image resolution settings. Start it with ./change_display_A20_OLinuXino.sh and follow the instructions. Please refer to chapter 2.5 “Changing the default image resolution” for more details.

6.15 Jumper description

Please note that most the jumpers on the board are SMT type. If you feel insecure of your soldering/cutting technique it is better not to try to adjust the jumpers since it is possible to damage the board.

Board jumpers			
Jumper name	**Type**	**Default position**	**Function**
NAND_E	PTH	UBOOT	Changes the functionality of the BOOT/REC button – when in UBOOT position the button is used to enter bootloader mode (to connect via USB_OTG). When in REC
VPS-	SMT	Open	Reserved for future use of different types of NAND memories.
VPS+	SMT	Open	Reserved for future use of different types of NAND memories.

6.16 Additional hardware components

The components below are mounted on OLinuXino but are not discussed above. They are listed here for completeness:

Reset button – used to reset the board

2×2Gbytes (2×256Mb x 8 bit) DDR3 SDRAM – the exact memory used in the first revisions of the board is Memphis H5TQ2G83CFR-H9C H5TQ2G63BFR

1×32Gbytes (4096Mb x 8 bit) NAND FLASH – the exact memory is hynix H27UBG8T2A

PWR_LED – turns on upon powering the board
LED1 – GPIO button
CHGLED – lights when charging a battery connected to the Li-Po battery connector.

CHAPTER 7: SCHEMATICS

7. Introduction to the chapter

In this chapter is located information about the schematics describing logically and physically A20-OLinuXino-MICRO.

7.1 Eagle schematic

OLinuXino schematics may be found it on the OLinuXino's GitHub repository: https://github.com/OLIMEX/OLINUXINO/tree/master/HARDWARE/A20-OLinuXino-MICRO. You can download the whole repository as .zip without having a GitHub account.

Please note that the schematics of A10 (not to be confused with A10s) and A20 boards are the same since the two Allwinner processors are pin-to-pin compatible (drop-in replaceable).

Both the 4GB version and the version without NAND of the A20 MICRO share the same set of schematics.

We mostly use Eagle by Cad Soft 4.16r2 for designing. However, the files should be compatible with the latest Eagle available. Cad Soft offers a trial version of their software that allows you to inspect schematics and board files (without being able to modify them).

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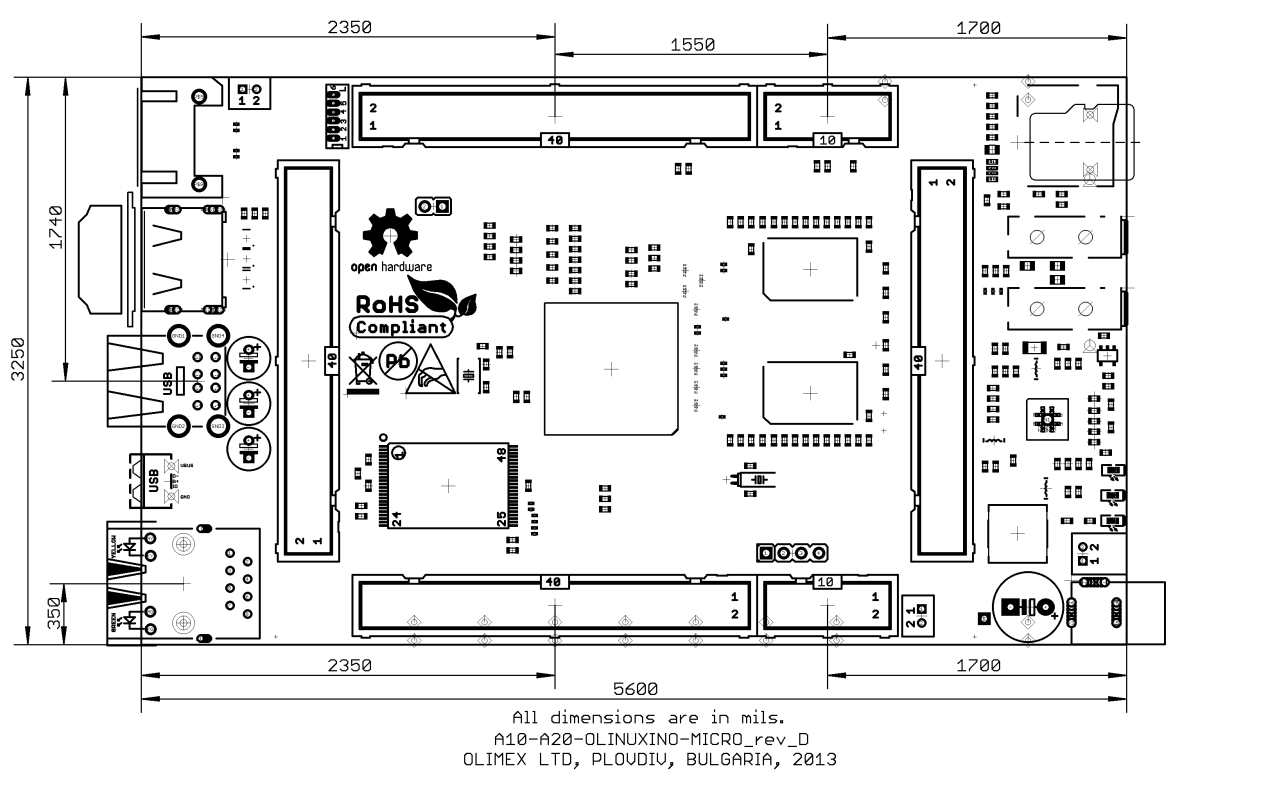
If you are looking for a schematic of an older revision of the board and it isn't available at our web site you may request it by the support e-mail.

7.2 Physical dimensions

Note that all dimensions are in mils.



The three highest elements on the board in order from the tallest to the shortest are: USB_HOST connector – 700mils, capacitors C202 – 650mils, the Ethernet connector – 600mils.

The heights listed above include the PCB height.

CHAPTER 8: REVISION HISTORY AND SUPPORT

8. Introduction to the chapter

In this chapter you will find the current and the previous version of the document you are reading. Also the web-page for your device is listed. Be sure to check it after a purchase for the latest available updates and examples.

8.1 Document revision

Revision, date	Notable changes	Modified page
A, 30.08.13	Initial manual release	All
B, 16.09.13	1. Quartz values error fixed 2. Updated the board revision changes	15 16
C, 18.09.13	1. Added new additional products 2. Added more information about the SD card booting	9 43
D, 30.09.13	1. Added few suggestions for USB boot 2. Added more information about power saving mode before complete Android booting	9
E, 02.10.13	1. Added more information about display setting 2. Added chapter about the VGA 3. Added FAQ section	11 29 42
F, 16.10.13	Added more information about A20-VGA-CABLE	Multiple pages

Revision, date	Changes	Modified page
G, 24.10.13	1. Added more information about SSH connection 2. Added more information about VGA output requirements 3. Improved the FAQ section	27 29 41
H, 27.05.14	1. Added more information about USB host ports 2. Added new information for latest board revisions	10 41
I, 30.05.14	1. Updated pictures with revision E 2. Updated document information to reflect the changes in the board 3. Adjusted several	1, 14, 15 26, 27 Multiple pages

8.2 Board revision

Remember to check the schematics and the board design files to compare the differences.

Revision	Notable changes
B	Initial release of the board
C	1. Resistor matrix RM23 gets replaced by: R133,R134,R135 2. Adjusted the package of H5TQ2G63BFR/MEM4G16D3EABG-125 3. R12 and R15 values changed to 0R 4. NAND_E jumper is changed from PTH to SMD closed 5. 5V_SATA_PWR connector (altogether with 2x2uF) is changed from WF2S to DW02S and placed near the PWR jack instead of original position 6. GPIO-4 is now correctly named GPIO-1 7. There is a signal for the power of of the SATA – PB8/SATA-PWR-EN (r136, c216, r138, t1, t137, fet4) 8. A jumper between 5V_E_SATA and 5V_PWR_SATA is added 9. The micro SD card connector is changed
D	Resistor optimizations
E	1. Adjusted and optimized the position of PCB names 2. R16 changed from 237R to 330R, for stability purposes 3. R7, R9 also changed from 237R to 330R, for stability

	purposes 4. R41 and R104 changed from 1k/1% to 390R for better sync signal and to improve the VGA signal (allowing it to work at FullHD)
F	1. Added 10M resistor in parallel to 32768 crystal else there might be hang-ups 2. Changed to 32768 crystal to SMD one 3. Few libraries updated 4. Added pads of two tantalum capacitors C222 and C223 near the USB-host 5. Positions adjusted – A20, NAND, SPIFLASH, LAN, matrix, capacitors, CARDs and other 6. Added tantalum capacitor 220uF/10V to ISPOUT 7. R48(13k/1%) changed to 6.8k/1% so there would be 1A of current on USB1; USB2 still gets 523mA maximum

8.3 Useful web links and purchase codes

The web pages you can visit for more information about your device are:
https://www.olimex.com/Products/OLinuXino/A20/A20-OLinuXino-MICRO-4GB/;
https://www.olimex.com/Products/OLinuXino/A20/A20-OLinuXino-MICRO/.

The wiki article for the board:https://www.olimex.com/wiki/A20-OLinuXino-MICRO

A place for general questions, FAQ or friendly talk: https://www.olimex.com/forum/.
You can get the latest updates on the software at: https://github.com/OLIMEX/OLINUXINO.
You may may join our IRC channel #olimex @ freenode.net (http://webchat.freenode.net/?channels=olimex).

ORDER CODES:

A20-OLinuXino-MICRO-4GB – the NAND version of A20-OLinuXino-MICRO with additional 4GB NAND memory (and built-in Android image)
A20-OLinuXino-MICRO – the lite version of A20-OLinuXino-MICRO with no external NAND

USB-SERIAL-CABLE-F – USB serial console cable female
USB-MINI-CABLE – standard USB type A to USB type mini cable
A20-VGA-CABLE – adapter from 6-pin connector to standard 15-pin VGA one
SY0612E – reliable power supply adapter 50Hz (for EU) 12V/0.5A for A20-OLinuXino-MICRO
SY0612E-CHINA – cheaper power supply adapter 50Hz (for EU) 12V/0.5A for A20-OLinuXino-MICRO
A20-Android-SD – a tested class 10 micro SD card with the latest (by the time of leaving the Olimex facilities) official Android release
A20-Debian-SD – a tested class 10 micro SD card with the latest (by the time of leaving Olimex facilities) official Debian Linux release
A13-LCD43TS – low-cost 4.3" LCD display with touchscreen component – 480×272

A13-LCD7 – low-cost 7" LCD display with optional touchscreen component – 800×480
A13-LCD10 – low-cost 10" LCD display with optional touchscreen component – 1024×600
How to purchase?

You can purchase directly from our online shop or from any of our distributors. Note that usually it is faster and cheaper to purchase Olimex products from our distributors. List of confirmed Olimex LTD distributors and resellers: https://www.olimex.com/Distributors.

Please visit https://www.olimex.com/ for more info.

8.4 Frequently asked questions

Q: I power my board, it shows a logo and then nothing happens.

A: This might be due to a number of reasons but it is recommended to try the following:

1. Download latest official image from our wiki (either Android or Debian; either for SD card or NAND memory), and upload it to the NAND or to an SD card again. There are instructions how to do it in the other questions below. Try if the board works now.

2. Check if your power supply provides enough current, try with different/better power supply.

3. Check the USB hub you are using, plug the USB cable directly to the back of your personal computer, check the USB cable.

4. The board might enter sleep mode very fast (especially if the Android was turned off without the “Quick Boot” mode being ticked on). Try pressing or holding down the PWR_BUT for a couple of seconds to wake it up.

Q: How do I write the Linux image to a micro SD card to use with my A20 board?

A: To write a Linux image to an SD card under Windows we use Win32 Disk Imager:

Download Win32 Disk Imager software
Insert card
Start program
Select file
Click "write"

To write a Linux image to an SD card under Linux - for example, if you have an image with file name "debian_2g.img". It would be downloaded to the SD card connected to a Linux machine using one of the following commands:

```
# dd bs=4M oflag=sync if=debian_2g.img of=/dev/sdX
```
or

```
# cp debian_2g.img /dev/sdX
```

where X is the uSD card.

Q: How to detect and enable the Ethernet controller (if it is disabled by default)?

A: You can enable it by following these two steps:

1. To check under what name the LAN is associated write "ifconfig –a"

2. If, for example, it is under eth0 name, then write: "dhclient eth0"

This should enable the Ethernet and then SSH would also be available.

You can also enable auto detection of Ethernet on power-up by uncommenting #auto eth0 in /etc/network/interfaces in the Linux image.

Q: How to generate boot-able SD-card Debian Linux image for A20-OLinuXino?

Follow our blog post with step by step instructions (at link: http://olimex.wordpress.com/2013/09/18/7795/) note that Linux-Sunxi Kernel is a work-in-progress, this means you can try the current stage/sunxi-3.4 branch but if something is broken and doesn't work just revert to the git tags we give in the blog and they should work for sure.

Q: How to install Android on an SD-card?

Two images are build one for 7″ LCD and one for 10″ LCD https://www.olimex.com/wiki/A20-OLinuXino-MICRO#Android
To write the images on the SD card you will need PhoenixSuit and to follow these steps:

- Install and run PhoenixSuit.
- Go to the firmware tab of the program and point to a valid Android image (note that the images on Gdrive are compressed and you have to extract them to .img files to be able write them with PhoenixSuit)
- Disconnect the power supply and USB cable from the A20 board. Put an SD card in micro SD holder. We recommend 4GB class 10 card.
- Press and hold RECOVERY button, apply power supply (6-16)V, release RECOVERY button.
- Connect USB cable to the mini USB connector.
- You will be asked for drivers for the boot-loader. Navigate to the folder where you extracted the PhoenixSuit and install the drivers from the respective executables (or manually point the installer to the drivers folder in the PhoenixSuit installation path).
- PhoenixSuit will detect the board and would ask for the method of writing the image. Choose method of writing the image and confirm your wish to write the image.
- Wait till upgrade succeeds

Note that it is not recommended to have your mini USB connected to an external USB hub. This might cause delays and might distort the signal levels. Always test with the USB connected straight to the USB ports of your computer.

Important: When Android runs for very first time it takes several minutes to initialize all files and buffers please do not cut the power supply during this process! Also when fresh image is installed fast boot may be disabled, which means that when you apply power supply after few seconds Android will go in sleep mode and you have to press POWER button to start it, you can change to fast boot when you power off there is dialog box asking you if you want next boot to be fast boot, you have to check this box before you power off. Also note that you must do touch screen calibration when you run Android for very first time which might require a mouse.

8.5 Product support

For product support, hardware information and error reports mail to: support@olimex.com. All document or hardware feedback is welcome. Note that we are primarily a hardware company and our software support is limited. Please consider reading the paragraph below about the warranty of Olimex products.

All goods are checked before they are sent out. In the unlikely event that goods are faulty, they must be returned, to OLIMEX at the address listed on your order invoice.
OLIMEX will not accept goods that have clearly been used more than the amount needed to evaluate their functionality.

If the goods are found to be in working condition, and the lack of functionality is a result of lack of knowledge on the customers part, no refund will be made, but the goods will be returned to the user at their expense.

All returns must be authorized by an RMA Number. Email support@olimex.com for authorization number before shipping back any merchandise. Please include your name, phone number and order number in your email request.

Returns for any unaffected development board, programmer, tools, and cables permitted within 7 days from the date of receipt of merchandise. After such time, all sales are considered final.

Returns of incorrect ordered items are allowed subject to a 10% restocking fee. What is unaffected? If you hooked it to power, you affected it. To be clear, this includes items that have been soldered to, or have had their firmware changed. Because of the nature of the products we deal with (prototyping electronic tools) we cannot allow returns of items that have been programmed, powered up, or otherwise changed post shipment from our warehouse.

All returned merchandise must be in its original mint and clean condition. Returns on damaged, scratched, programmed, burnt, or otherwise 'played with' merchandise will not be accepted.

All returns must include all the factory accessories which come with the item. This includes any In-Circuit-Serial-Programming cables, anti-static packing, boxes, etc.

With your return, enclose your PO#. Also include a brief letter of explanation of why the merchandise is being returned and state your request for either a refund or an exchange. Include the authorization number on this letter, and on the outside of the shipping box.

Please note: It is your responsibility to ensure that returned goods reach us. Please use a reliable form of shipping. If we do not receive your package we will not be held liable.

Shipping and handling charges are not refundable. We are not responsible for any shipping charges of merchandise being returned to us or returning working items to you.

The full text might be found at https://www.olimex.com/wiki/GTC#Warranty for future reference.

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